

more gas valves, one or more igniters, each of said one or more igniters being connected to ensure ignition of the gas delivered to said gas burners, and one or more temperature sensors, each of said sensors connected and placed to monitor the presence of flames at each of the said burners, the cooktop being characterized in being adapted to operate alternatively in either of first and second modes, said first mode having continuous flame modulation varying continuously between predetermined lower first and higher second heating levels, and said second mode having intermittent flame for producing heating levels less than said lower first heating level for simmering operation, said intermittent flame being controlled between on and off states by said one or more gas valves, said gas valves being controlled by a pulse-width modulated electrical signal provided by said controller in accordance with said user entry.

2. (original) A cooktop as in claim 1, wherein said user interface comprises one or more touch-sensitive pads.
  3. (original) A cooktop as in claim 1, wherein each of said gas valves comprises a proportionally controlled solenoid-operated modulating gas valve wherein no gas flow condition is measured in its fully closed position.
  4. (original) A cooktop as in claim 3, wherein each of said gas valves comprises a proportionally controlled solenoid-operated modulating gas valve wherein maximum gas flow is measured in its fully open position.
  5. (Currently amended) A cooktop as in claim 4, wherein each of said gas valves ~~comprises a proportionally controlled solenoid-operated modulating gas valve~~ is also capable of providing any intermediate controlled position.
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6. (original) A cooktop as in claim 1, wherein said user interface comprises a multiplicity of touch-sensitive pads operable to select burner heating levels in a

predetermined set of user-selectable steps.

7. (original) A cooktop as in claim 6, wherein a lowest portion of said user-selectable steps corresponds to a flame "on/off" sequencing mode of flow settings of gas valves.
8. (original) A cooktop as in claim 6, wherein a highest portion of said user-selectable steps corresponds to a continuous flame modulation mode of flow settings of said gas valves.
9. (original) A cooktop as in claim 6, wherein said each of said user-selectable steps corresponds to a multiplicity of flow settings of said gas valves in a predetermined range of flow settings.

10. (Currently amended) A cooktop as in claim 2, wherein said user interface further comprises a visual interface including a display selected from the list consisting of:

- a) seven-segment LED displays[.];
- b) discrete LED displays[.];
- c) bar-graph LED displays[.];
- d) LCD displays[.];
- e) vacuum fluorescent displays[.]; and
- f) field-emission displays.

11. (Currently amended) A cooktop as in claim 2, wherein said user interface further comprises an audible interface including an annunciator selected from the list consisting of:

- a) an external drive piezo-acoustic element[.];
- b) a built-in drive piezo-acoustic element[.];
- c) an external drive magnetic transducer[.];
- d) a built-in drive magnetic transducer[.];
- e) an external drive Mylar speaker[.]; and
- f) a built-in drive Mylar speaker.

12. (original) A cooktop as in claim 1, wherein said igniter comprises a resistive hot-surface igniter.

13. (Currently amended) A cooktop, comprising:

- a) one or more gas burners;
- b) one or more gas valves, each of said valves being connected to control gas flow to one of said gas burners;
- c) a user interface for user entry of burner heating level for each of said one or more gas burners, wherein said user interface comprises a multiplicity of touch-sensitive pads operable to select burner heating levels in a predetermined set of user-selectable steps and wherein a lowest portion of burner heating levels corresponds to a flame "on/off" sequencing mode of flow settings of said one or more gas valves;
- d) a controller operative to control each of said one or more gas valves in accordance with said user entry entered for the corresponding one of said one or more gas valves;
- e) one or more igniters, each of said igniters being connected to ensure ignition of the gas delivered to the said gas burners; and
- f) one or more temperature sensors, each of said sensors being connected and placed to monitor the presence of flames at each of the said burners.

14. Canceled

15. (original) A cooktop as in claim 13, wherein each of said gas valves comprises a proportionally controlled solenoid-operated modulating gas valve wherein no gas  
flow condition is measured in its fully closed position.

16. (original) A cooktop as in claim 13, wherein each of said gas valves comprises a proportionally controlled solenoid-operated modulating gas valve wherein maximum gas flow is measured in its fully open position.
17. (original) A cooktop as in either of claims 15 and 16, wherein each of said gas valves comprises a proportionally controlled solenoid-operated modulating gas valve is also capable of providing any intermediate controlled position.
18. Canceled
19. Canceled
20. (original) A cooktop as in claim 18, wherein a highest portion of said user-selectable steps corresponds to a continuous flame modulation mode of flow setting of gas valves.
21. (Currently amended) A cooktop as in claim 18, wherein ~~said~~ each of said user-selectable steps corresponds to a multiplicity of flow settings of said gas valves in a predetermined range of flow settings.
22. (Currently amended) A cooktop as in claim 13, wherein said user interface further comprises a visual interface including a display selected from the list consisting of:
- a) seven-segment LED displays[.];
  - b) discrete LED displays[.];
  - c) bar-graph LED displays[.];
  - d) LCD displays[.];
  - e) vacuum fluorescent displays[.]; and
  - f) field-emission displays.
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23. (Currently amended) A cooktop as in claim 13, wherein said user interface further

comprises an audible interface including an annunciator selected from the list consisting of:

- a) an external drive piezo-acoustic element[.];
- b) a built-in drive piezo-acoustic element[.];
- c) an external drive magnetic transducer[.];
- d) a built-in drive magnetic transducer[.];
- e) an external drive Mylar speaker[.]; and
- f) a built-in drive Mylar speaker.

24. (original) A cooktop as in claim 13, wherein said igniter comprises a resistive hot-surface igniter.

25. (Original) A heating device, comprising:

a burner;

an electronic controller for electronically controlling a first mechanism and a second mechanism;

said first electronically controlled mechanism for controlling flow of gas to said burner capable of providing at least two different on-levels of continuous gas flow to said burner; and

said second electronically controlled mechanism for controlling flow of gas to said burner capable of stopping and starting flow of gas to said burner, wherein combination of said first mechanism and said second mechanism provides capability to achieve a lower temperature than is achievable with just continuous flow of gas from said first mechanism.

26. (Previously Amended) A heating device as recited in claim 25, wherein said first electronically controlled mechanism is capable of providing 30 different on-levels of gas flow.

27. (Previously Amended) A heating device as recited in claim 25, wherein a flame is produced at said burner, wherein said electronic controller is capable of controlling said second mechanism for sequencing the flame on and off at a predetermined level of flame.

28. (Previously Amended) A heating device as recited in claim 27, wherein said controller comprises a microcontroller, wherein sequencing the flame on and off is controlled by said microcontroller.



29. (Previously Amended) A heating device as recited in claim 28, wherein said microcontroller further comprises a pulse width modulation output port and an A/D converter.
30. (Previously Amended) A heating device as recited in claim 27, wherein sequencing the flame on and off is controlled by time.
31. (Previously Amended) A heating device as recited in claim 27, wherein sequencing the flame on and off is accomplished with the on level set to a predetermined medium level of flame or with the on level set to a medium-low level of BTU output.
32. (Previously Amended) A heating device as recited in claim 27, wherein sequencing the flame on and off is accomplished with gas flow on and off for time periods to correspond to a desired simmer level.
33. (Previously Amended) A heating device as recited in claim 25, wherein said controller uses pulse-width-modulation for controlling said first mechanism.
34. (Previously Amended) A heating device as recited in claim 25, further comprising an igniter, wherein said igniter assures flame re-ignition when said second mechanism is used.
35. (Previously Amended) A heating device as recited in claim 34, wherein said igniter does not need to be synchronized with flame on/off cycling during simmer mode
36. (Previously Amended) A heating device as recited in claim 35, wherein said igniter is continuously powered when said second mechanism is used.
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37. (Previously Amended) A heating device as recited in claim 34, wherein said igniter comprises a resistive hot-surface igniter.

38. (Previously Amended) A heating device as recited in claim 37, wherein said igniter comprises a ceramic hot-surface igniter capable of constant re-ignition
39. (Previously Amended) A heating device as recited in claim 25, further comprising a main in-line solenoid safety valve.
40. (Previously Amended) A heating device as recited in claim 25, further comprising a plurality of burners, wherein said device comprises one of said first electronically controlled mechanisms and one of said second electronically controlled mechanisms for each said burner.
41. (Previously Amended) A heating device as recited in claim 25, wherein said first mechanism comprises a variable orifice solenoid that has a plurality of positions controlled by application of a voltage signal.
42. (Previously Amended) A heating device as recited in claim 25, wherein a single gas valve includes both said first electronically controlled mechanism and said second electronically controlled mechanism.
43. (Previously Amended) A heating device as recited in claim 25, further comprising an igniter for igniting gas when said first electronically controlled mechanism provides flow of gas.
44. (Previously Amended) A heating device as recited in claim 43, wherein said igniter is a hot- surface igniter.
45. (Previously Amended) A heating device as recited in claim 43, further comprising an igniter for igniting gas when said first electronically controlled mechanism and said second electronically controlled mechanism provides flow of gas.
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46. (Previously Amended) A heating device as recited in claim 45, wherein said igniter is set to be on continuously when said second electronically controlled mechanism is being used to stop and start flow of gas to said burner.
47. (Previously Amended) A heating device as recited in claim 43, further comprising a circuit to monitor ignition by sensing temperature or sensing current flowing in said igniter.
48. (Previously Amended) A heating device as recited in claim 25, further comprising a user interface.
49. (Previously Amended) A heating device as recited in claim 48, wherein said user interface comprises a dial control.
50. (Previously Amended) A heating device as recited in claim 48, wherein said user interface comprises touch switches.
51. (Previously Amended) A heating device as recited in claim 50, wherein said touch switches comprises a touch pad.
52. (Previously Amended) A heating device as recited in claim 48, wherein said user interface comprises a capacitive touch keyboard.
53. (Previously Amended) A heating device as recited in claim 48, wherein said user interface comprises a power key, an on key, power level control keys, and an off key.
54. (Previously Amended) A heating device as recited in claim 25, further comprising a digital visual display of cooking level of each burner.

55. (Previously Amended) A heating device as recited in claim 54, wherein said digital visual display comprises an LED, LCD, or a vacuum fluorescent display
56. (Previously Amended) A heating device as recited in claim 25, further comprising a temperature sensor fixed to a burner base.
57. (Previously Amended) A heating device as recited in claim 56, further comprising an igniter and a circuit to detect current flowing in said igniter, wherein if no current flows in said igniter or no elevated temperature is sensed with said temperature sensor then visual and audible alarms are generated.
58. (Currently amended) A gas valve for supplying gas, comprising a first electronically controlled flow control mechanism and a second electronically controlled flow control mechanism of a different type from said first electronically controlled flow control mechanism, wherein both said first electronically controlled flow control mechanism and said second electronically controlled flow control mechanism can be used together to provide less gas than said first electronically controlled flow control mechanism can provide alone while providing more than zero gas, wherein said second electronically controlled mechanism is capable of stopping and starting flow of gas external to the valve.

59. (Currently amended) A method of heating comprising the steps of:

- a) electronically energizing an igniter[.];
- b) providing a microcontroller and a valve, said valve comprising a modulating portion and a time based sequencer portion;
- ~~b-c~~) electronically setting a level to a said modulating valve portion, wherein said modulating portion can be set in a range of levels to provide a range of flow rates, wherein said microcontroller is connected to provide a signal for said electronic setting[.]; and
- ~~c-d~~) electronically setting a said time based sequencer portion to provide a selected BTU output level, wherein said sequencer is capable of stopping and starting flow of gas, wherein said microcontroller is connected to provide a signal for said stopping and for said starting.

60. (Original) The method as recited in claim 59, further comprising the step of displaying said selected level.

61. (Previously added) A heating device as recited in claim 25, further comprising a main in-line valve for closing off flow if a fault condition occurs.

62. (Previously added) A heating device as recited in claim 61, further comprising an igniter, wherein said igniter is de-energized if a fault condition occurs.

63. (Previously added) A cooktop as in claim 13, further comprising a main in-line solenoid safety valve.

64. (Previously added) A device for controlling flow of a fluid, comprising:

an electronic controller, a first mechanism and a second mechanism, said electronic controller for electronically controlling said first mechanism and said second mechanism;

said first electronically controlled mechanism for controlling flow of fluid capable of providing at least two different on-levels of continuous fluid flow; and

said second electronically controlled mechanism capable of stopping and starting flow of fluid, wherein combination of said first mechanism and said second mechanism provides capability to achieve a lower quantity of fluid over time than is achievable with just continuous flow of fluid from said first mechanism.

65. (Previously added) A device as recited in claim 64, wherein said fluid comprises gas.

66. (Previously added) A device as recited in claim 65, wherein said first electronically controlled mechanism is capable of providing any intermediate level of gas flow.

67. (Previously added) A device as recited in claim 65, wherein said first electronically controlled mechanism is capable of providing 30 different on-levels of gas flow.

68. (Previously added) A device as recited in claim 65, wherein said electronic controller is capable of controlling said second mechanism for sequencing flow on and off at a predetermined level.

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69. (Previously added) A device as recited in claim 68, wherein said controller comprises a microcontroller, wherein sequencing fluid flow on and off is controlled

by said microcontroller.

70. (Previously added) A device as recited in claim 69, wherein said microcontroller further comprises a pulse width modulation output port and an A/D converter.
71. (Previously added) A device as recited in claim 68, wherein sequencing the flow on and off is controlled by time.
72. (Previously added) A device as recited in claim 68, wherein sequencing the flow on and off is accomplished with the on level set to a medium-low level.
73. (Previously added) A device as recited in claim 68, wherein sequencing the flow on and off is accomplished with gas flow on for 1 second and off for 8 seconds.
74. (Previously added) A device as recited in claim 64, wherein said controller uses pulse-width-modulation for controlling said first mechanism.
75. (Previously added) A device as recited in claim 64, further comprising a main in-line solenoid safety valve.
76. (Previously added) A device as recited in claim 64, wherein said first mechanism comprises a variable orifice solenoid that has a plurality of positions controlled by application of a voltage signal.
77. (Previously added) A device as recited in claim 64, wherein said fluid comprises gas and wherein a single gas valve includes both said first electronically controlled mechanism and said second electronically controlled mechanism.
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78. (Previously added) A device as recited in claim 64, further comprising a user interface.

79. (Previously added) A device as recited in claim 78, wherein said user interface comprises a dial control.
80. (Previously added) A device as recited in claim 78, wherein said user interface comprises touch switches.
81. (Previously added) A device as recited in claim 80, wherein said touch switches comprises a touch pad.
82. (Previously added) A device as recited in claim 78, wherein said user interface comprises a capacitive touch keyboard.
83. (Previously added) A device as recited in claim 78, wherein said user interface comprises a power key, an on key, power level control keys, and an off key.
84. (Previously added) A device as recited in claim 64, further comprising a digital visual display of flow.
85. (Previously added) A device as recited in claim 84, wherein said digital visual display comprises an LED, LCD, or a vacuum fluorescent display